MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

**Regulatory Impact Report**
**10 CSR 20-7.015 Effluent Regulations**

Pursuant to Section 640.015, Revised Statutes of Missouri (RSMo), all rulemakings that prescribe environmental conditions or standards promulgated by the Missouri Department of Natural Resources pursuant to authorities granted in Chapters 640, 260, 278, 319, 444, 643, or 644 shall be based on a regulatory impact report. This requirement does not apply to rules where the Department Director determines that immediate action is necessary to protect human health, public welfare, or the environment; or to rules of applicable federal agencies adopted by the Department without variance.

Upon completion of the comment period, official responses will be developed and made available on the agency web page prior to filing an Order of Rulemaking with the Secretary of State. Contact information is at the end of this regulatory impact report.

1. **A report on the peer-reviewed scientific data used to commence the rulemaking process.**

   **a.** Total Phosphorous Target Reduction – In 1997, the Hypoxia Task Force (Task Force) was established to understand the causes and effects of eutrophication in the Gulf of Mexico, as well as coordinate efforts to reduce the size, severity, and duration of the hypoxic zone. Specifically, the Task Force has focused on coordinating and supporting nutrient management activities in the Mississippi River and Gulf of Mexico watersheds. The Task Force based its assessments on six scientific documents, available on the Task Force webpage: https://www.epa.gov/ms-htf/history-hypoxia-task-force.

   The Task Force then researched nutrient management and released *A Science Strategy to Support Management Decisions Related to Hypoxia in the Northern Gulf of Mexico and Excess Nutrients in the Mississippi River Basin*[1]. In addition, four symposia were conducted in 2005-2006 with the purpose of assessing the science of hypoxia, nutrient impacts, and nutrient management.

   The conclusions from all of these scientific assessments was that if the goal of reduction of the Gulf of Mexico hypoxic zone was to be met, "significant resources must be provided and targeted toward implementing the most effective nutrient reduction actions in Mississippi River Basin states with the greatest loadings of nitrogen and phosphorus to the Gulf." The action plan included state agencies establishing and implementing nitrogen and phosphorus reductions for programs or projects with state implementation authority.

   In developing this state-specific rule for Total Phosphorous (TP) reduction, the Water Protection Program also researched generally available total phosphorus and wastewater treatment data, as well as state-specific total phosphorus data including: monitoring

[1] https://toxics.usgs.gov/hypoxia/mmr_strategy_report.pdf

records from influent and effluent of total phosphorus, areas where total phosphorus reductions were already implemented, technologies currently in use for reduction of phosphorus, and other related sources.

**b.** Drinking Water Supply Lakes – The proposed rule amendment at 10 CSR 20-7.015(3)(C)3 provides an authorization to discharge highly treated wastewater to the watersheds of lakes currently designated as Class L1 - lakes used primarily for public drinking water supply. The proposed authorization provides an option for dischargers to meet protective effluent limitations and discharge waters to these drinking water supply lakes for the purpose of water reuse and drought mitigation. This amendment adds to discharge authorizations already existing in this rule since June 13, 1988 and are not anticipated to cause water quality issues in these lakes. Protective effluent limitations for biochemical oxygen demand (BOD), total suspended solids (TSS), and nutrients (total phosphorous, total nitrogen) were derived using advanced wastewater treatment technology and the "Missouri Antidegradation Rule and Implementation Procedure."

**c.** Rule Text Revisions – The proposed rule amendment will also include the following revisions to provide clarity and improve consistency and readability of the rule:

1) Include appropriate references to the new total phosphorous target reduction level language referenced above;
2) Add a definition for nutrient credit consistent with the rule language associated with total phosphorous reduction listed above;
3) Move losing stream determination and effluent limitation language, without change, from 10 CSR 20-7.031 (Water Quality Standards) to this rule;
4) Correct typographical errors in rule references.

The proposed rule language amendments listed above to improve clarity and consistency did not need to rely on peer-reviewed scientific data or references to implement the respective rule changes.

2. **A description of persons who will most likely be affected by the proposed rule, including persons that will bear the costs of the proposed rule and persons that will benefit from the proposed rule.**

**a.** This proposed rulemaking language requires reduction of total phosphorus at domestic wastewater treatment facilities that discharge one million gallons per day or more and industrial facilities categorized as major (assessments are conducted in accordance with the U.S. Environmental Protection Agency's (EPA) Permit Major/Minor Designation Request policy). This rulemaking potentially affects 134 large facilities that are currently discharging, or may potentially be discharging, phosphorus. Seven of these facilities are commercial/industrial facilities and will bear the cost of their treatment options or alternatives; one industrial facility is already meeting these limits. The remaining 126 facilities are domestic wastewater treatment facilities, but 8 of those facilities are currently meeting the proposed regulatory thresholds. Whether privately or publically owned or managed, it is assumed that the costs of treatment upgrades or alternatives will be passed along to those individuals and businesses currently being served by these wastewater treatment facilities (WWTF). This proposed rule language does not impact smaller, independent permitted facilities, like those at mobile home parks, residential

developments, or other domestic facilities discharging less than one million gallons per day or those conducting land application in lieu of discharge.

While this rulemaking establishes total phosphorus target reduction levels for permitted facilities, the Department acknowledges that numerous phosphorus reduction activities have occurred since the 1996 Hypoxia Task Force assessment. Historic data and research conducted by the Task Force (referenced above) found that historic influent total phosphorus concentrations were likely close to 8 milligrams per liter (mg/L) with little treatment. Around 2010, 17 states implemented bans on the use of phosphates in detergents. While not all states banned the use of phosphates, industries implemented phosphate reductions in their detergents, regardless of the intended point of sale, resulting in a nationwide reduction of phosphorus in wastewater discharges to domestic wastewater treatment facilities. Additionally, new or more stringent water quality criteria and effluent limits for other pollutants, such as ammonia, suspended solids, and bacteria, resulted in improved wastewater treatment systems that also removed nutrients from their discharges. Through all of these material changes, treatment improvements, and system upgrades, the domestic facility category has seen a substantial reduction in total phosphorus, with this rule moving to a 1.0 mg/L or equivalent concentration in effluent.

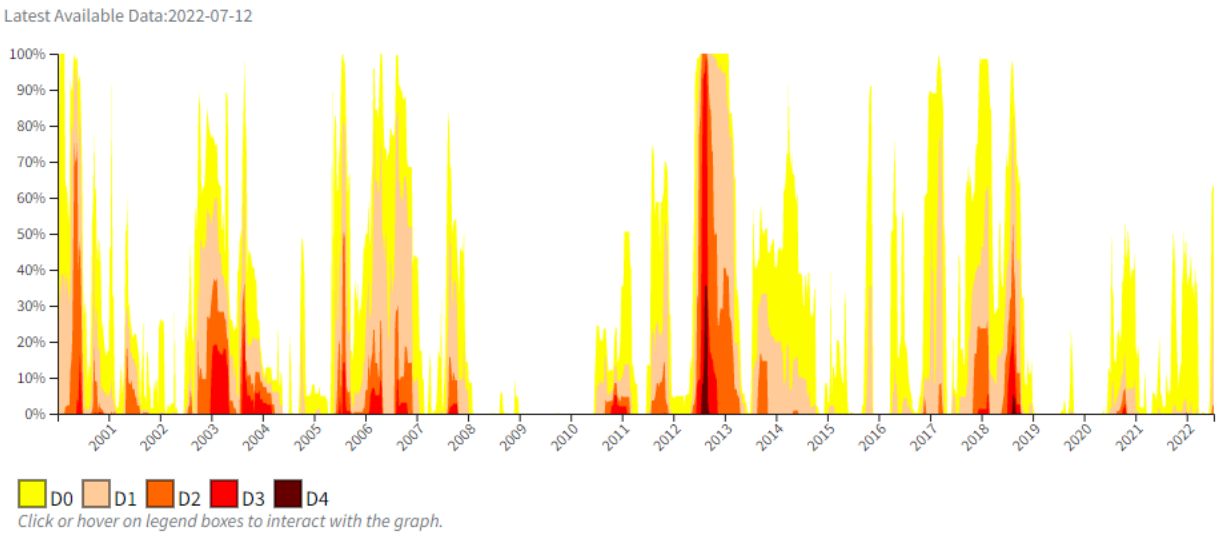
The industrial facility category, however, has likely not realized the same reductions in phosphorous concentrations. The impact of the phosphate ban in detergents was likely less pronounced for these facilities as detergent use is not a significant proportion of their waste stream. Furthermore, while domestic facilities underwent wastewater treatment upgrades and conventional system installations, industrial facilities have unique processes and effluent characteristics and did not undergo system installations similar to the domestic facilities. Even today, some of these wastewater discharges have little or no treatment of total phosphorus in their effluent. In short, the total reductions that have occurred to date at domestic facilities are likely not mirrored in the industrial facilities. Furthermore, the total phosphorus usage at these sites varies widely, from simple domestic wastewater and cleaning to agrichemical manufacturing that concentrates and uses high volumes of nutrients in their production activities. As a result of these differences, representatives from the industrial sector requested an “equitable” total phosphorus reduction, rather than a reduction down to a concentration of 1 mg/L. This rule therefore incorporates an option for industrial facilities to meet a 75 percent reduction in total phosphorous, rather than the 1 mg/L target reduction level.

In summary, domestic facilities will be 94.4 percent of the facilities impacted by this proposed rule and will likely end up removing approximately 93.8 percent of the phosphorus expected in response to this proposed rulemaking. Industrial facilities will be 5.6 percent of the facilities impacted by this proposed rule and are expected to bear 6.2 percent of the phosphorus load reduction anticipated from this proposed rulemaking.

In addition to nutrient reduction benefits to the Gulf of Mexico, the proposed rulemaking will also reduce nutrients within in-state waters and improve water quality in streams and lakes in Missouri. Excess nutrients in streams and lakes can cause eutrophication, which is excess algae or plant growth that can impact aquatic life habitat, reduce dissolved oxygen concentrations, and potentially contribute to harmful algal blooms which may generate cyanotoxins that impact recreational activities. Nutrient criteria have already been established for most lakes in Missouri, with specific total phosphorus effluent

limitations for the Table Rock Lake and Lake Taneycomo watersheds. The impact of the Table Rock Lake/Lake Taneycomo total phosphorous effluent regulation resulted in improved water clarity in these reservoirs. This proposed rule amendment establishes total phosphorus reductions for the largest dischargers of phosphorus statewide regardless of their receiving waterbody. As such, this proposed rule will help reduce nutrients statewide, thereby improving water quality and the designated uses of our waters. This improvement will benefit all Missourians who use our waters for swimming, boating and kayaking, fishing, and other activities. Nutrient reductions that improve water quality will also benefit Missourians that use our waters for irrigation, livestock watering, and all who use surface waters as the source of their drinking water. In short, improving water quality benefits everyone.

**b.** This rule also creates an authorization to discharge to lakes designated as Class L1-lakes used primarily for public drinking water supply. The proposed amendment provides an option for dischargers to meet protective effluent limitations and discharge waters to theses drinking water supply lakes for the purpose of water reuse and drought mitigation. The U.S. Drought Monitor started collecting national drought data in 2000, through the National Oceanic and Atmospheric Administration (NOAA's) National Integrated Drought Information System, a multi-agency partnership specifically designed to coordinate drought information and planning. The U.S. Drought Monitor graph below demonstrates the frequency of dry and drought conditions in Missouri since 2000 (https://www.drought.gov/).




The categorization listed above includes the following conditions: "abnormally dry" (D0 yellow), "moderate drought" (D1 peach), "severe drought" (D2 orange), "extreme drought" (D3 red), and "exceptional drought" (D4 burgundy). Recurring drought and water usage concerns affect all Missourians and this proposed rule authorizes protective means to enhance water storage in drinking water supply lakes in a manner that protects water quality standards. No additional costs are anticipated with this rule, as it simply offers a new option previously unavailable. It potentially benefits all dischargers to Class L1-lakes, as well as those communities and customers that receive drinking water from these reservoirs.

**c.** The rule also includes language to: 1) add a definition for nutrient credit consistent with the rule language listed above, 2) correct typographical errors in rule references, 3) move the losing stream determinations and effluent limitations for losing streams from 10 CSR 20-7.031 to this rule, where it is more appropriately located, without change, and 4) include the appropriate references to the new total phosphorus target reduction level language referenced above. These proposed rule language revisions provide clarity and consistency benefits and are not anticipated to have negative impacts.

3. **A description of the environmental and economic costs and benefits of the proposed rule.**

**a.** Economic costs for total phosphorous reduction are calculated here using chemical treatment to reduce phosphorus. It is anticipated that chemical treatment will be the main total phosphorous reduction technology for all but one facility. While this is typically the most cost-efficient technology to install, this rule offers flexibility that reduces these costs significantly. The estimated cost to install chemical treatment is expected to be higher than actual costs to comply with the rule due to the flexibilities in the rule, which include:

1) Nutrient Credit Trading. One chemical manufacturer, BASF, stated that they cannot install treatment technology and will instead be required (based on their facility operations) to use nutrient credit trading. Based on a study conducted by Barr Engineering in two watersheds in Missouri, the cost to generate nutrient credits from three common nonpoint source agricultural practices are as follows:

a) Cover Crops - $13.04 per pound of total phosphorus (TP) removed
b) Water and Sediment Control Basins- $9.30 per pound of TP removed
c) Terrace Systems- $11.40 per pound of TP removed.

Assuming that i) only a 50 percent credit allowed for each pound of TP removed, ii) these are combined or averaged for cost assessment purposes, and iii) the farmer marks the cost up for profit by 25 percent, then each pound of TP credit would cost $28.13.

This value was used to calculate the cost of compliance for only the one facility noted above for the purposes of this Regulatory Impact Report (RIR). However, this cost, if applicable and available for affected facilities, may be substantially lower than installing treatment, which was the cost used in developing this RIR. However, if all facilities were to use nutrient credits for compliance, the cost would likely rise substantially. In Virginia's Chesapeake Bay area, where nutrient credits are in short supply and high demand, the cost per pound of nutrient credit ranges from $10,800 to $24,000. As such, using the equipment installation costs and annual maintenance costs is appropriate for all but this one chemical manufacturer.

BASF has indicated to the Department that they will use nutrient trading has hazardous waste generating activities that could be significantly impacted by using traditional, less expensive phosphorus removing technology. The facility discharges chemicals through the wastewater treatment system that, if removed in sludge or other solids settling, would be categorized as hazardous waste in accordance with the Resource Conservation and Recovery Act. This facility's operations are unique and their decision is based on

consideration of all environmental regulations that may apply. As such, the cost for compliance for this facility is estimated to be 29 percent of the total annual recurring costs for compliance.

2) Regulated facilities may comply with a direct 1.0 mg/L concentration or a mass-based equivalent value based on their design flow. For facilities operating below their design flow, the reduction required may be substantially less, and therefore less costly than calculated herein. An example of this difference:

Facility Description: Facility has a design flow of 9.5 million gallons per day (MGD) but an actual flow of 5.89 MGD.

- Reduction target is 49.12 pounds (lbs) TP per day, if using the 1.0 mg/L target
- Reduction target is 79.23 lbs TP per day, if using the mass target based on design flow

The cost calculations are based on the 1.0 mg/L concentration, but the actual cost for facilities operating at less than design flow will be less if using the mass-based option. Of the 135 facilities, 129 operate at less than their design flow. However, if their flow increases over time, their cost benefit is reduced if using this method for compliance.

3) Regulated facilities may sell any excess TP reductions they generate at their site. If a facility must meet a 25,000 lbs of TP per year reduction target, but actually only discharges 15,000 lbs of TP per year, they may sell or trade the 10,000 lbs of TP that they did not use. This results in financial gain for the facility or a reduction in cost at another facility under the same ownership where the credits may be used. This also allows flexibility in compliance and may reduce the cost for some facilities to comply.

4) Facilities may combine the above options to meet the proposed total phosphorus target reductions. Facilities may already comply with the new requirement without the need for additional treatment or the above options. Based on the department's initial analysis of facility effluent data, 9 facilities already comply with the new standard without addition of treatment.

The economic cost of this proposed rule, without reduction for the numerous flexibilities and cost savings listed above, is estimated to be $25,296,694 for initial equipment installation and maintenance, based on the expected cost of the tanks and piping appropriate for each facility. The anticipated annual recurring material supply cost of $30,986,557 per year for the 125 facilities requiring additional treatment or trading to meet the proposed rule changes. The total for annual recurring costs includes $8,217,962 that are associated with one industrial facility (BASF). These costs are summarized below for both the domestic and industrial wastewater treatment categories.

Appendix A provides an assessment of the annual recurring costs of chemical addition for phosphorus removal from domestic facilities, assuming a current average discharge of 3.2 mg/L and a reduction to 1.0 mg/L at design flow. Table A below summarizes the assessment conducted for the annual recurring costs for all domestic wastewater facilities.

Table A. Estimated Annual Recurring Costs for Domestic Wastewater Facilities

| Facility Size (design flow) | Number of Facilities | Average Annual cost per facility | Annual Recurring Total Cost |
|---|---|---|---|
| 1-10 MGD | 99 | $55,846.12 | $5,528,765.69 |
| 10-50 MGD | 14 | $378,458.91 | $5,317,879.24 |
| 50- 100 MGD | 2 | $1,128,359.23 | $2,256,718.46 |
| >100 MGD | 3 | $3,015,442.77 | $9,046,328.32 |
| | **Total for Domestic WWTFs** | | **$22,149,691.71** |

For the assessment of the industrial facilities, the same technologies were used as the assumed treatment method for reduction of phosphorus. However, the calculations, were based on the actual concentrations of total phosphorus at the facility rather than an average TP concentration estimated for the domestic facilities. The 75 percent reduction target level (TRL) was determined and the annual recurring cost calculations were based on those values. These assumptions are likely extremely conservative as the calculations were based on the concentrations at design flow, but the final permit calculations will be based on the actual flow. This means that the current total phosphorus discharge is likely lower than the values listed in Table B. As a result, the actual total phosphorus reduction needed will likely be less than the calculations provided below. The design flows are based on the outfall(s) that typically discharge phosphorus at these facilities. Table B below summarizes the assessment conducted for the industrial facilities designated as major that typically discharge phosphorus.

Table B. Estimated Annual Recurring Costs for Industrial Wastewater Facilities

| Facility | Design Flow | Influent or Historic Effluent | 75% TRL | TP (lbs) to remove / day | Metal salt (lbs) / day | Chemical cost per year |
|---|---|---|---|---|---|---|
| Bayer CropScience | 2.8 | 12.68 | 3.17 | 222.07752 | 215.04 | $235,469.82 |
| Biokywa | 2 | 7.21 | 4.3085 | 48.39702 | 46.86 | $51,315.58 |
| Calumet | 0.029 | 4.76 | 1.19 | 0.8634402 | 0.84 | $915.51 |
| Proctor & Gamble | 2 | 5.5 | 1.375 | 68.805 | 66.62 | $72,954.26 |
| Tyson | 2.32 | 8.6 | 2.15 | 124.79976 | 120.85 | $132,325.76 |
| Smithfield | 1.08 | 17.58 | 4.395 | 118.759932 | 115.00 | $125,921.71 |
| | | | | | **Industrial Facility Subtotal** | $618,902.65 |
| **BASF*** | 2.5 | 45.7 | 11.425 | 800.3898 | | $8,217,962.25** |
| | | | | | **Industrial Facility Total** | $8,836,864.90 |

**This data is the chemical manufacturer listed in section 2 above.*

***The costs calculated are based on nutrient trading rather than chemical treatment.*

Another method to assess the economic cost of the proposed total phosphorous target reductions would be to calculate the cost per pound of total phosphorus removed from discharge to waters of the state. Excluding the cost of the one chemical manufacturer (BASF) as not representative of the true cost of phosphorus reduction (as their cost is largely associated with the cost of managing and mitigating potential hazardous waste), the total annual recurring cost for chemical treatment is calculated at $22,749,139 after initial equipment installation and potential calibration adjustments. The amount of calculated total phosphorus removal from discharges associated with this calculation is

7,831,179.61 pounds annually, with the cost of removal of total phosphorus at $2.90 per pound.

Domestic facilities' total phosphorus reductions should account for approximately 93.8 percent of the total phosphorus reductions, while bearing 71.5 percent of the annual costs. This disparity is largely due to the amount of nutrient treatment that has already occurred or is already occurring at these facilities; conversely, some of the industrial facilities have historically had little or no phosphorus treatment and removal from their wastewater. The range of total phosphorus concentrations in the wastewater of industrial facilities ranges from an average of 4.76 mg/L to an average of 45.7 mg/L with some extreme daily variations in concentrations associated with industrial activities at the facility.

Economic benefits are associated with continued beneficial use of state waters and the Gulf of Mexico for tourism, recreation, and industry. Excess nutrients may lead to eutrophication (algal growth), reduction or mortality of aquatic life, and may even contribute to harmful algal blooms. Excess algae growth may also inhibit the use of the water for irrigation and livestock watering. Excess algae and the impacts to aquatic life may also result in reduction of recreational uses, like fishing, swimming, wading, and boating. Harmful algal blooms, or even other algal blooms that simply have not been properly assessed, can result in closure of swimming areas and other recreational activities on lakes. Closure of lakes due to harmful algal blooms results in a loss of revenue for the community when boating, fishing, and swimming are not allowed or recommended. These activities support fueling, dining, and shopping on and around the lake areas. Excess nutrients in discharges can have an environmental impact on streams and lakes in Missouri, as listed in response to the questions above.

Failure to control excess nutrients can cause eutrophication, excess algae or plant growth, and reduce dissolved oxygen content, which can result in impacts to aquatic life, including but not limited to fish and shellfish, as well as wildlife. The impacts to aquatic life can be a reduction in the population or reproduction in the fish community and may even result in mortality events. Increased algae in waters may block or clog irrigation systems and may be undesirable or unusable for wildlife and livestock watering. Recreational uses, such as swimming, fishing, wading, and boating may decline significantly if the water contains high levels of algae, declining fish populations, aquatic life mortalities, and detritus. Harmful algal blooms, which can generate cyanotoxins, are also associated with high concentrations of phosphorus. Cyanotoxins can be toxic to humans, fish, shellfish, wildlife, livestock, and pets.

In direct economic terms, beneficiaries from the proposed rule may be owners of water front property in the state. Several studies have indicated that increased water clarity associated with nutrient reduction is a significant factor in raising the value of such property. (Michael et al., 1996; Wilson and Carpenter 1999). Steinnes (1992), found an average increased value of $235 per lakeshore lot for each 1 meter (m) increase in water transparency as measured with a Secchi disk. Conversely, numerous studies have demonstrated that the reduced water clarity associated with excessive nutrient loading have resulted in a wide range of losses of home values (U.S. EPA, 2015). Krysel et al. (2003) analyzed more than 1,200 lakeshore property sales in northern Minnesota that occurred between 1996 and 2001. Water clarity was a significant explanatory variable for lakeshore property prices. A loss of 1 m in Secchi depth could result in losses of up to

$80,000 sales value in an individual lot. Kashian and Kasper (2010) found a decrease of $128 to $402 in the value per shoreline foot in Wisconsin lakes that had high algae blooms, when compared with nearby lakes that did not have this problem.

In regards to the economy of the Gulf of Mexico, a November 2021 report from the U.S. Department of Commerce[2] estimates that the combined state product of the Gulf Region (AL, FL, LA, MS, and TX) was approximately $3.3 trillion in 2017. This estimate included 1.4 million employer establishments operating throughout the gulf region (including marine and non-marine establishments), employed 23.3 million workers and had a total annual payroll of $1.1 trillion. The economic impacts of continued or worsening gulf hypoxia could therefore be significant.

Other economic beneficiaries include businesses that are reliant on tourism-related stream and lake recreation, such as restaurants, hotels, and marinas, as well as gas stations both near to and on the way to or from resort areas. Several studies demonstrated relationships between lake water clarity and levels of tourist recreation (Bouwes and Schneider, 1979; Ribaudo and Epp, 1984; Smith et al., 1986; Wilson and Carpenter, 1999). Protected and enhanced water clarity will maintain and improve opportunities for whole body contact recreation. And, while some sport fishing potential is enhanced with higher nutrient loading, the potential for greater aquatic biodiversity tends to increase with reduced nutrient loading (Egertson and Downing, 2004).

Citizens that rely on certain public drinking water systems will also benefit. There are at approximately 30 communities that rely on Missouri streams as a source for drinking water supply (MDNR, 2018). Drinking water systems that use lakes as a source would experience fewer episodes of taste and odor problems that can occur as a consequence of excessive nutrient loading. Furthermore, improved water quality in drinking water reservoirs would lead to a reduction in the cost of treating the water by reducing organic matter and other pollutants that require additional treatment.

Finally, a 2021 study from the University of Missouri-Columbia assessed the economic impacts of phosphorus reductions from the 1999 rule for Table Rock Lake. The following excerpt provides a summary analysis of the potential economic benefit of that 1999 rule:

> *First, and most importantly, the study estimated that from October 2004 to September 2005, "$267 million in total spending by visitors at Table Rock Lake included $214 million that was spent within 30 miles of the lake, 90 percent of this by non-local visitors who brought $193 million in new spending to the local economy" (Kasul, et al., 2010, p. 24). In 2021 dollars, this equates to approximately $362 million in spending attributed to Table Rock Lake alone. These dollars had an estimated social impact of "3,645 jobs [and] $88 million in labor income" with the impact corresponding to "Barry, Christian, Stone, and Taney Counties in Missouri" (Kasul, et al., 2010, p. 25). These numbers help quantify how crucial Table Rock Lake is for the economic health of the surrounding area.*

[2] Fisheries Economics of the United States 2018, https://media.fisheries.noaa.gov/2022-07/FEUS-2018-final-v2_0.pdf

*The survey analysis is also relevant based on the priorities of the respondents. The study explains that visitor expectations and perceptions are crucial to the economic health and viability for a body of water. Based on the responses to the survey, the two most important lake or site attributes for those completing the survey were (1) Water quality and (2) Natural beauty of the area. For water quality, 95 percent of respondents rated it as very important or important, while for the natural beauty of the area, 94 percent of respondents rated it as very important or important (Kasul, et al., 2010, p. 42). [Redinger and Kweon, 2021].*

While Table Rock Lake is a large waterbody in what has become a highly tourist area and these calculations cannot be used to predict the economic benefits of the proposed total phosphorus reduction rule, the data illustrates the economic benefit to a community resulting from enhanced recreational uses of their local water body.

**b.** It is difficult to estimate the economic and environmental costs or benefits expected to result from the addition of an alternative to discharge high-quality effluent to lakes designated as drinking water supply for water reuse and drought resiliency because the number and type of communities that will take advantage of this alternative is currently not known. It is generally anticipated, however, that there will be both economic and environmental benefits for communities that become self-sufficient in regards to drinking water supplies that support human health, public welfare, and the environment.

**c.** No significant economic and environmental costs or benefits are expected to result from the addition of definitions and revisions that provide clarity and consistency in the rule text.

4. **The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenue.**

**a.** The facilities impacted by this proposed rule amendment are already regulated and permitted by the Department. Department staff draft state operating permits, conduct inspections, provide compliance assistance, and pursue enforcement of these facilities for non-compliance. Existing state regulations at 10 CSR 20-7.015(9)(D)8 already require statewide nutrient monitoring for point sources with a design capacity of greater than 100,000 gallons/day. Permit writers will need to review facility permits impacted by this rule and require TP monitoring where these requirements are not already existing and review all TP data submitted to the Department. Permit writers will now need to establish limits in operating permits for one more pollutant of concern (TP) as a result of this rule. Inspectors will need to review one more data set during their routine review to ensure compliance and provide compliance assistance, as needed. For each facility, the additional time expended by Department staff is expected to be no more than an average of 1.5 hours per facility per year (with permits and inspections on a 5 year rotation). Based on the average cost per hour of $44.56 for an Environmental Assistant/Analyst (permit writer or inspector), and 135 impacted facilities, the annual cost to the Department is anticipated to be $9,023.40. Because these facilities are already permitted by the Department and have an established permit fee, no additional income is expected to be added to state revenue. Direct impacts to other state agencies are expected to be minimal as these sites are already regulated by the Department.

The implementation of this rulemaking effort also includes plans for the Department to quantify, assess, and track historic and ongoing nutrient discharge reductions to Missouri waters. Some of this effort is already ongoing and many of these calculations are currently underway as part of water body assessments, modeling, and establishment of water quality effluent limitations for nutrient impacted waters. The Department is already working on consolidating this data in response to expectations from, and goals established by, the Hypoxia Task Force. As such, the additional cost associated with actual rule implementation and tracking should be minimal.

**b.** The addition of an alternative to discharge high-quality effluent to lakes designated as drinking water supply for water reuse and drought resiliency is not anticipated to increase costs for the Department during routine operating permit issuance. Because these facilities are already permitted by the Department and have an established permit fee, no additional income is expected to be added to state revenue. No impacts are anticipated to other state agencies.

**c.** Revisions to add clarity and consistency to the proposed rule are not anticipated to increase state revenue or fees, and are not anticipated to impact the Department or other state agencies.

5. **A comparison of the probable costs and benefits of the proposed rule to the probable costs and benefits of inaction, which includes both economic and environmental costs and benefits.**

**a.** The probable costs and benefits of the proposed rule are listed above. The cost of inaction is somewhat difficult to quantify as the effects of declining water quality are often long-term and changes are subtle. However, as the hypoxic zone in the Gulf of Mexico and associated eutrophication studies have demonstrated, excess nutrients can have a dramatic effect on our waters and their uses. The environmental costs of the negative impacts listed above to recreation and the aquatic communities in the gulf would be significant. The economic impacts of inaction are difficult to quantity precisely, but in general terms eutrophication induced hypoxia is anticipated to negatively impact recreation, tourism, and recreational and commercial fisheries in the region over time. As noted previously, the combined state product of the Gulf Region (AL, FL, LA, MS, and TX) was approximately $3.3 trillion in 2017. The impacts of inaction could therefore be significant.

While the hypoxic zone and reductions in Missouri's nutrient contribution are the primary goal for this proposed rule, continued nutrient discharges through inaction could have similar impacts to water quality here in Missouri. A November 2021 report for the Missouri Agricultural and Small Business Development Authority indicates that approximately 1 in 10 jobs, on average, in Missouri are supported by agricultural activities. The report also states that agriculture and related industries contribute $34.9 billion, 456,618 jobs, $93.7 billion in output and $31.8 billion in household income. Specifically livestock production, which relies heavily on waters of the state for livestock watering, adds $9.5 billion to Missouri's economy and 155,425 jobs. These agricultural activities, though, require water that can be used for irrigation, livestock watering and fishing.

Reduction of nutrient discharges to waters of the state is vital in maintaining these uses of our state waters. Inaction could result in short-term and long-term impacts to the sustainability of these uses, with those agricultural uses being reduced or hindered by declines in water quality associated with increasing nutrients in our waters. Inaction could result in waters that have eutrophication associated with elevated nutrients, increased algal growth, and even a potential for harmful algal blooms. All of these negative impacts could also render those waters unusable as an irrigation or livestock watering source. Furthermore, reduction in nutrients should enhance waters of the state and directly benefit recreational uses in Missouri. Inaction could potentially have the converse effect. Waters with high nutrient content typically have increased plant and algae growth and low dissolved oxygen content, which can result in mortality of fish and other aquatic life, general criteria violations and be generally unappealing for recreational use. Waters that are useable and appealing for recreational use are anticipated to have a positive impact on tourism and recreation dollars.

**b.** Inaction to include an alternative to discharge high-quality effluent to lakes designated as drinking water supply for water reuse and drought resiliency will leave the current prohibition against these discharges in place. The probable costs of inaction are difficult to quantify, but would occur in the acquisition and distribution of drinking water for impacted communities during extreme drought conditions. The costs to acquire and supply drinking water to customers could be significant if a community is required to replace its water supply with other sources, including bottled water.

**c.** Inaction to include revisions that add clarity and consistency to the proposed rule will allow the rule text to remain "as is" and not provide the clarity and consistency offered by the revisions.

6. **A determination of whether there are less costly or less intrusive methods for achieving the proposed rule.**

**a.** This rulemaking process initially began with a single option for compliance, specifically installation of wastewater treatment technology to meet one concentration value for TP. Throughout the rulemaking process, numerous less costly or less intrusive methods were added to the rule to create additional options for compliance. The rule also adds flexibility in the timeline for compliance, thereby building in the ability to spread costs out over time in a manner that is viable and sustainable for the facility. The options for compliance are outlined in question number three above.

**b.** Increasing drought resiliency through discharge to a drinking water supply lake must come with increased costs of treatment to ensure the lake is protected from eutrophication. The increase in treatment to reduce nutrients will prevent short-term eutrophication, prolong the lifespan of the drinking water supply, and potentially offset the costs to acquire and distribute alternative drinking water supplies during drought conditions. Therefore, there are no less costly or less obtrusive methods for achieving drought resiliency and mitigation.

**c.** There are no less costly or less obtrusive methods for achieving the desired improvements in clarity and consistency of the proposed rule.

7. **A description of any alternative method for achieving the purpose of the proposed rule that were seriously considered by the Department and the reasons why they were rejected in favor of the proposed rule.**

**a.** Additional proposals to the proposed rule were reviewed, including alternative and less stringent total phosphorus reduction levels. However, these proposals were rejected based on the data and goals established by the hypoxia task force and the state's data analysis for total phosphorus reductions. Due to nutrient issues in both Lake Taneycomo and Table Rock Lake, effluent limits were established for facilities discharging into these lakes. These limits are more stringent than the statewide total phosphorus reduction levels in this proposed rule. In reviewing the impact of the nutrient reductions at these two lakes, and in reviewing the positive impacts within the lakes, the Department determined that significant increases to the proposed target thresholds would devalue the impact of the rule. Furthermore, in accordance with the national hypoxia task force, the Department has statewide nutrient reduction targets to meet Missouri's goals for reducing nutrient discharge to the Gulf of Mexico and the hypoxic zone. The Department is making efforts to reduce nonpoint source discharges of nutrients by utilizing opportunities through the Soil and Water Conservation Program and the Section 319 grant program to assist in voluntary reductions from agricultural and other nutrient rich areas. This rule targets permitted point source nutrient discharges and fulfills a specific component of Missouri's Nutrient Loss Reduction Strategy, which is a statewide nutrient reduction plan. Increasing TP discharge thresholds would lessen nutrient reductions and would not meet the Department's and Missouri's goals established by the Hypoxia Task Force for the Gulf of Mexico hypoxic zone or protection and enhancement of state waters. The proposed total phosphorous target reduction strikes a balance to meet state and national goals for nutrient reduction while providing various methods and timelines for compliance.

**b.** Alternative methods (e.g., effluent limitations) were considered for the proposed rule but were rejected because they would not have provided long term protection of the drinking water supply from eutrophication. The proposed rule meets the intended purpose of the rule for drought resiliency while protecting and maintaining good water quality.

**c.** No alternative methods or rule language were considered to the proposed rule that will add clarity and consistency to the rule.

8. **An analysis of both short-term and long-term consequences of the proposed rule.**

**a.** Short-term impacts of nutrient reduction should be a decline in eutrophication, algal growth, and an increase in dissolved oxygen content in the waters receiving discharges from facilities subject to the proposed rule. The Department expects to see improvements in aquatic life, fish, and macroinvertebrate communities due to these reductions. Waters impacted directly by these reductions are expected to be clearer and cleaner, with enhanced recreational and wildlife usage when compared to before the proposed rule.

The long-term consequences are the primary goal of this rule. The intention is to reduce the nutrient impacts from Missouri to the Gulf of Mexico hypoxic zone. Reduction of nutrients from Missouri and other hypoxia task force states will help decrease the size of the gulf hypoxic zone, increase the diversity and quality of gulf fisheries, and support the

marine and non-marine economy of the region. This goal also results in reductions in nutrients in waters of the state as well. The benefits and consequences of those nutrient reductions are listed above in question number three.

**b.** The short-term impact of allowing an alternative discharge to Class L1 lakes is that it will provide communities with another option for drought resiliency and provide an opportunity not previously available. Communities can in the short-term begin planning for future drought conditions and invest in the wastewater treatment infrastructure necessary to meet effluent limitations found in the rule. The long-term impact will be greater resiliency for these communities against drought and the uncertainty of whether adequate drinking water supply will be available when it is needed.

**c.** The short and long-term consequences of the proposed rule text revisions are additional clarity and consistency in the regulation which will make for more straightforward implementation and application of the rule.

9. **An explanation of the risks to human health, public welfare or the environment addressed by the proposed rule.**

**a.** As noted previously, reduction of nutrients from Missouri and other hypoxia task force states will help decrease the size of the gulf hypoxic zone, increase the diversity and quality of gulf fisheries, and support the marine and non-marine economy of the region. Reduction of nutrients in waters of the state is expected to result in less eutrophication and algal growth, better oxygenation, improved aquatic habit, better water sources for irrigation, wildlife and livestock, and enhanced and better recreational opportunities. These risks to human health, public welfare, and the environment are covered in more detail in question number three.

**b.** Prolonged droughts can reduce the quantity, quality, and availability of public drinking water supplies for municipal, industrial, and agricultural uses. Providing an alternative for discharge to Class L1 lakes will produce and promote resiliency of public drinking water supplies during drought and reduce the risks associated with limited water supplies for human and agricultural use during those periods.

**c.** The rule text revisions that provide clarity and consistency reduce the risk of misinterpretation or application of the proposed rule. This in turn should reduce risks to human health, public welfare, and the environment.

10. **The identification of the sources of scientific information used in evaluating the risk and a summary of such information.**

**a.** The national Hypoxia Task Force began researching the Gulf of Mexico hypoxic zone in 1997. Since its formation, the Task Force has researched, studied, and assessed the impacts of nutrients to water quality. Many studies, presentations, reports, proposals, and plans for nutrient reductions are available on the EPA webpage: https://www.epa.gov/ms-htf. In addition to this library of scientific information, the Department also reviewed data from Missouri facilities. The Department assessed permitted facilities to determine those that currently discharge phosphorous and then analyzed those as well as their discharge characteristics such as flow, current TP concentrations, the potential cost of treatment to

reduce TP concentrations, and other facility-specific considerations for compliance. This information provided estimates of current TP loading from these facilities and the amount of TP reduction that could be expected upon full implementation of the rule. The Department reviewed data from Lake Taneycomo and Table Rock Lake and the facilities discharging to those watersheds to determine the impacts of previous TP rules. The Department also reviewed data, rules, and TP rule development from neighboring states. These information were used to establish the current total phosphorous target reduction level and provide multiple means to comply with the new requirement. In doing so, the Department minimized the risk to human health, public welfare, and the environment while providing economically viable means achieve the goals of the rulemaking.

**b.** The Department reviewed data from past droughts in Missouri and the need to provide an alternative scenario that allows for water reuse during these times. The proposed effluent limitations will provide high quality effluent for the purpose of water supply during drought conditions and ensure that water quality in the Class L1 lakes receiving these discharges does not degrade. Additional protections against eutrophication in these watersheds include developing or updating source water protection plans in conjunction with plans for water reuse. This action will also reduce the risk of future eutrophication and contamination of the Class L1 lake.

**c.** As noted previously, the proposed rule language amendments improve clarity and consistency and did not need to rely on peer-reviewed scientific data or references to implement the respective rule changes.

11. **A description and impact statement of any uncertainties and assumptions made in conducting the analysis on the resulting risk estimate.**

**a.** The Department assumed that major municipal and certain industrial point source discharges contribute the majority of point source nutrient loading to waters of the state and represent Missouri's point source nutrient contribution to the Gulf of Mexico. The Department recognizes that nonpoint sources are also significant contributors of nutrients, but that other voluntary programs are targeted at reducing those nonpoint source discharges of phosphorus. This rule targets the facilities permitted under the Department' state statutory authority under Missouri Clean Water Law and delegated authority under the federal Clean Water Act.

Nutrient reductions are assumed to have impacts on eutrophication, algal growth, dissolved oxygen content, and the size and composition of aquatic communities. However, nutrient reduction does not have a defined, consistent, or direct impact on these factors. Other factors such as water temperature, water movement (reaeration), sunlight, sediment, solids, pH, mineral content, other pollutants, and many other considerations can impact water quality. Reduction of nutrients in some water bodies may have a dramatic and noticeable effect, while the impact in other water bodies may be less noticeable or quantifiable. This rule also targets only the largest dischargers of nutrients and did not target specific waterbodies or consider how widespread the reduction would be to state waters. The rule also does not assess or adjust the nutrient reductions based on the probability that they will reach the Mississippi River (i.e., attenuation), nor does it try to devalue those reductions that may have less of an impact on the hypoxic zone. The rule

does establish targets for statewide phosphorus discharge reductions that are anticipated to have a net benefit to in-state and interstate waters, including the Gulf of Mexico.

**b.** The Department assumed that creating an authorization in rule to allow for discharge to Class L1 lakes would reduce risk and uncertainly on the availability public water supplies during times of drought. Additionally, the Department assumed that the high-level of treatment required for discharge to these waters would protect and prolong the useful of these reservoirs and reduce the risk of eutrophication. The discharge effluent limitations are based on multiple antidegradation analyses to state waters and should protect Class L1 lakes. However, all discharge scenarios are site-specific and if additional treatment or lower effluent limitations are necessary, the Department would require them in any operating permit authorizing discharge.

**c.** As noted previously, the proposed rule language amendments improve clarity and consistency and did not involve any uncertainties or assumptions in the calculation of risk.

12. **A description of any significant countervailing risks that may be caused by the proposed rule.**

**a.** Other than the economic impacts listed above, and the associated safety, operations, and maintenance that may be required for enhanced phosphorus treatment at permitted facilities, no other countervailing risks were identified.

**b.** The proposed rule amendment to add an alternative for water reuse during periods of drought reduce risk to public drinking water supplies. The countervailing risk to allowing discharge to Class L1 drinking water supplies could arise in the form of extra treatment (solids reduction and/or carbon) if the effluent limitations for the discharge are not low enough to prevent eutrophication. However, the risk of not having a drinking water supply during times of drought is greater than any countervailing risk that may occur.

**c.** As noted previously, the proposed rule language amendments improve clarity and consistency and did not involve any uncertainties or assumptions in the calculation of risk. Therefore, there are no countervailing risks that may be caused by the proposed rule.

13. **The identification of at least one, if any, alternative regulatory approaches that will produce comparable human health, public welfare or environmental outcomes.**

**a.** Voluntary reductions of nonpoint source nutrient loading to waters of the state could address the negative impacts of nutrients in state waters as well as the Gulf of Mexico. Historically, nonpoint source nutrient reductions have largely been voluntary and driven by funding best management practices through the Department's Soil and Water Conservation Program and Section 319 grant funding, United States Department of Agriculture (USDA) and National Resources Conservation Service (NRCS), and other similar programs. These programs are vital in reducing nutrients from nonpoint sources. However, the impact of these programs is variable and dependent on volunteers willing to participate in the programs. These efforts also do not address point source loading of nutrients to state waters and the Gulf of Mexico. The combination of total phosphorous

reduction targets, along with voluntary nonpoint source nutrient reductions, will over time reduce the cumulative impacts of nutrients on state waters and the gulf.

**b.** The Department did not identify any alternative approach that would produce comparable human health, public welfare, or environmental outcomes to the proposed rule. The allowance for water reuse of high quality effluent will provide communities flexibility during drought conditions without unnecessarily risking water quality.

**c.** The Department did not identify any alternative approach to the proposed rule text revisions that would produce comparable human health, public welfare, or environmental outcomes.

14. **Provide information on how to provide comments on the Regulatory Impact Report during the 60-day period before the proposed rule is filed with the Secretary of State.**

Information about this draft rule and associated implementation documentation may be found on our webpage: https://dnr.mo.gov/water/what-were-doing/water-planning/nutrient-loss-reduction-strategy.

Comments can be provided on either the RIR or the draft rule text by sending them to the contact listed below or on the web site https://dnr.mo.gov/laws-rules-regulations during the RIR comment period:

Heather Peters
Missouri Department of Natural Resources
Water Protection Program, Watershed Protection Section
P.O. Box 176
Jefferson City, MO 65102-0176

or call: 573-522-9793 or e-mail: heather.peters@dnr.mo.gov (Please note the comment or question pertains to this RIR.)

Copies of the comments made on either the RIR or the draft rule text may be obtained by request from the contact listed above or by accessing the Rules in Development section on the web site https://apps5.mo.gov/proposed-rules/rules.action#OPEN for this particular rulemaking.

# Appendix A

This table provides an assessment conducted of the annual recurring costs of chemical addition for phosphorus removal from domestic facilities, assuming a current average discharge of 3.2 mg/L and a reduction to 1.0 mg/L at design flow.

| Facility Name | Design Flow | lbs of P to remove | lbs metal salt to add | chemical cost |
|---|---|---|---|---|
| **Aurora WWTP** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Belton WWTP** | 2.26 | 41.46648 | 40.1526 | $43,967.10 |
| **Blue Springs, Sni A Bar WWTF** | 10.0 | 183.48 | 177.6664 | $194,545 |
| **Bolivar WWTF** | 2.55 | 46.7874 | 45.30493 | $49,608.90 |
| **Boonville Wastewater Treatment Plant** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Branson, Compton Drive** | 5.3 | 97.2444 | 94.16319 | $103,108.69 |
| **Branson, Cooper Creek WWTF** | 3.400 | 62.3832 | 60.40657 | $66,145.20 |
| **Brookfield WWTP** | 1.0 | 18.348 | 17.76664 | $19,454.47 |
| **Butler WWTP** | 1.500 | 27.522 | 26.64996 | $29,181.70 |
| **California South WWTFP** | 1.7 | 31.1916 | 30.20329 | $33,072.60 |
| **Cameron WWTP** | 1.600 | 29.3568 | 28.42662 | $31,127.15 |
| **Cape Girardeau Municipal WWTF** | 11 | 201.828 | 195.433 | $213,999 |
| **Carl Junction WWTP** | 1.6 | 29.3568 | 28.42662 | $31,127.15 |
| **Carrollton WWTP** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Carthage WWTP** | 7.000 | 128.436 | 124.3665 | $136,181.29 |
| **Caruthersville WWTF** | 1.000 | 18.348 | 17.76664 | $19,454.47 |
| **Cassville WWTP** | 1.1 | 20.1828 | 19.5433 | $21,399.92 |
| **Center Creek WWTF** | 4.8 | 88.0704 | 85.27987 | $93,381.45 |
| **Charleston WWTF** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Chillicothe WWTP** | 3.0 | 55.044 | 53.29992 | $58,363.41 |
| **Clinton WWTP** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Columbia WWTP** | 20.6 | 377.9688 | 365.9928 | $400,762 |
| **Cuba WWTP** | 1.55 | 28.4394 | 27.53829 | $30,154.43 |
| **DCSD Treatment Plant 1** | 5.0 | 91.74 | 88.83319 | $97,272.35 |
| **DCSD Wastewater Treatment Plant #2** | 7.0 | 128.436 | 124.3665 | $136,181.29 |
| **De Soto WWTP** | 1.4 | 25.6872 | 24.87329 | $27,236.26 |
| **Dexter East WWTF** | 1.8 | 33.0264 | 31.97995 | $35,018.05 |
| **Eldon WWTP** | 1.00 | 18.348 | 17.76664 | $19,454.47 |
| **Eureka WWTF** | 2.8 | 51.3744 | 49.74659 | $54,472.51 |
| **Excelsior Springs WWTF** | 3.5 | 64.218 | 62.18324 | $68,090.64 |
| **Farmington East WWTP** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Farmington West WWTP** | 2.4 | 44.0352 | 42.63993 | $46,690.73 |
| **Festus-Crystal City WWTP** | 3.0 | 55.044 | 53.29992 | $58,363.41 |
| **Fort Leonard Wood WWTF** | 5.000 | 91.74 | 88.83319 | $97,272.35 |
| **Fulton WWTP** | 2.93 | 53.75964 | 52.05625 | $57,001.60 |
| **Glaize Creek Sewer District WWTP** | 1.2 | 22.0176 | 21.31997 | $23,345.36 |
| **Harrisonville WWTF** | 2.4 | 44.0352 | 42.63993 | $46,690.73 |
| **Herculaneum WWTP** | 1.045 | 19.17366 | 18.56614 | $20,329.92 |
| **Hollister WWTF** | 3.200 | 58.7136 | 56.85324 | $62,254.30 |
| **Independence Rock Creek WWTF** | 10 | 183.48 | 177.6664 | $194,545 |
| **Jackson WWTP** | 2.4 | 44.0352 | 42.63993 | $46,690.73 |

| | | | | |
|---|---|---|---|---|
| **Jefferson City RWRF** | 11 | 201.828 | 195.433 | $213,999 |
| **Joplin Shoal Creek WWTP** | 6.500 | 119.262 | 115.4832 | $126,454.05 |
| **Joplin Turkey Creek WWTF** | 15.000 | 275.22 | 266.4996 | $291,817 |
| **KC Birmingham WWTP** | 20.000 | 366.96 | 355.3328 | $389,089 |
| **KC Rocky Branch WWTP** | 2.8 | 51.3744 | 49.74659 | $54,472.51 |
| **KC, Blue River WWTF** | 105.000 | 1,926.54 | 1,865.50 | $2,042,719 |
| **KC, Fishing River WWTF** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **KC, Todd Creek WWTP** | 3.400 | 62.3832 | 60.40657 | $66,145.20 |
| **KC, Westside WWTP** | 22.5000 | 412.83 | 399.7494 | $437,726 |
| **Kearney WWTF** | 1.125 | 20.6415 | 19.98747 | $21,886.28 |
| **Kennett WWTF** | 1.400 | 25.6872 | 24.87329 | $27,236.26 |
| **Kirksville WWTP** | 3.160 | 57.97968 | 56.14258 | $61,476.12 |
| **Lake of the Ozarks Regional WWTP 1** | 3.0 | 55.044 | 53.29992 | $58,363.41 |
| **LBVSD Atherton WWTP** | 52 | 954.096 | 923.8652 | $1,011,632 |
| **LBVSD Middle Big Creek WWTP** | 2.25 | 41.283 | 39.97494 | $43,772.56 |
| **Lebanon WWTP** | 2.6 | 47.7048 | 46.19326 | $50,581.62 |
| **Liberty WWTP** | 5.00 | 91.74 | 88.83319 | $97,272.35 |
| **Macon WWTP** | 2.5 | 45.87 | 44.4166 | $48,636.17 |
| **Marshall SE WWTP** | 7.1 | 130.2708 | 126.1431 | $138,126.73 |
| **Marshfield WWTP** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Maryville WWTP** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Mexico WWTP** | 3.000 | 55.044 | 53.29992 | $58,363.41 |
| **Moberly WWTP** | 3.500 | 64.218 | 62.18324 | $68,090.64 |
| **Monett Wastewater Treatment Plant** | 6.0 | 110.088 | 106.5998 | $116,726.82 |
| **Mount Vernon WWTP** | 1.35 | 24.7698 | 23.98496 | $26,263.53 |
| **MSD Bissell Point WWTP** | 150 | 2,752.20 | 2,665.00 | $2,918,170 |
| **MSD Coldwater Creek WWTP** | 40 | 733.92 | 710.6656 | $778,179 |
| **MSD Fenton WWTP** | 6.75 | 123.849 | 119.9248 | $131,317.67 |
| **MSD Grand Glaize WWTP** | 21 | 385.308 | 373.0994 | $408,544 |
| **MSD Lower Meramec WWTP** | 16 | 293.568 | 284.2662 | $311,272 |
| **MSD Missouri River WWTP** | 38 | 697.224 | 675.1323 | $739,270 |
| **MSD, Lemay WWTP** | 210 | 3,853.08 | 3,730.99 | $4,085,439 |
| **Nevada WWTF** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Nixa WWTF** | 4 | 73.392 | 71.06656 | $77,817.88 |
| **NPSD Interim Saline Creek Regional WWTP** | 4 | 73.392 | 71.06656 | $77,817.88 |
| **Oak Grove WWTF** | 1.3 | 23.8524 | 23.09663 | $25,290.81 |
| **Odessa SE WWTP** | 1.0 | 18.348 | 17.76664 | $19,454.47 |
| **O'Fallon WWTP** | 11.25 | 206.415 | 199.8747 | $218,863 |
| **Ozark WWTF** | 2.1 | 38.5308 | 37.30994 | $40,854.39 |
| **Pacific WWTP** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Park Hills Mineral Belt WWTP** | 2.05 | 37.6134 | 36.42161 | $39,881.66 |
| **PCRSD Brush Creek Facility** | 2.00000 | 36.696 | 35.53328 | $38,908.94 |
| **Perryville Southeast WWTF** | 1.8 | 33.0264 | 31.97995 | $35,018.05 |
| **Pevely WWTP** | 1.8 | 33.0264 | 31.97995 | $35,018.05 |
| **Poplar Bluff Municipal WWTP** | 2.9 | 53.2092 | 51.52325 | $56,417.96 |
| **RCSD Kimmswick WWTP** | 4.8 | 88.0704 | 85.27987 | $93,381.45 |
| **Republic WWTP** | 3.2 | 58.7136 | 56.85324 | $62,254.30 |
| **Richmond South WWTP** | 2.0 | 36.696 | 35.53328 | $38,908.94 |
| **Rolla SE WWTP** | 4.765 | 87.42822 | 84.65803 | $92,700.55 |
| **Rolla Southwest WWTP** | 1.0 | 18.348 | 17.76664 | $19,454.47 |

| | | | | |
|---|---|---|---|---|
| **Savannah WWTF** | 1.0 | 18.348 | 17.76664 | $19,454.47 |
| **Sedalia Central WWTP** | 2.5 | 45.87 | 44.4166 | $48,636.17 |
| **Sedalia North WWTP** | 2.500 | 45.87 | 44.4166 | $48,636.17 |
| **Sedalia Southeast WWTP** | 2.6 | 47.7048 | 46.19326 | $50,581.62 |
| **Sikeston WWTP** | 5.0 | 91.74 | 88.83319 | $97,272.35 |
| **Smithville WWTP** | 1.125 | 20.6415 | 19.98747 | $21,886.28 |
| **Springfield Northwest Clean Water Plant** | 6.8 | 124.7664 | 120.8131 | $132,290.39 |
| **Springfield SW WWTP** | 64 | 1174.272 | 1137.065 | $1,245,086 |
| **St Charles-Mississippi River WWTF** | 9.63 | 176.6912 | 171.0927 | $187,346.54 |
| **St Clair WWTF** | 1.06 | 19.44888 | 18.83264 | $20,621.74 |
| **St Robert WWTP** | 1 | 18.348 | 17.76664 | $19,454.47 |
| **St. Charles Missouri River WWTP** | 7.54 | 138.3439 | 133.9605 | $146,686.70 |
| **St. James WWTF** | 1.0 | 18.348 | 17.76664 | $19,454.47 |
| **St. Joseph Water Protection Facility** | 27.000 | 495.396 | 479.6992 | $525,271 |
| **St. Peters Spencer Creek WWTP** | 9.5 | 174.306 | 168.7831 | $184,817.46 |
| **Sullivan WWTP** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Trenton Municipal Utilities WWTP** | 3.0 | 55.044 | 53.29992 | $58,363.41 |
| **Troy Hwy 47 Wastewater Treatment Plant** | 1.3 | 23.8524 | 23.09663 | $25,290.81 |
| **Troy Southeast WWTP** | 1.0 | 18.348 | 17.76664 | $19,454.47 |
| **Union West WWTF** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Warrensburg East WWTP** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Warrensburg West WWTP** | 1.5 | 27.522 | 26.64996 | $29,181.70 |
| **Warrenton WWTP** | 3.2 | 58.7136 | 56.85324 | $62,254.30 |
| **Washington WWTP** | 4.0 | 73.392 | 71.06656 | $77,817.88 |
| **Waynesville WWTP** | 1.250 | 22.935 | 22.2083 | $24,318.09 |
| **Wentzville Water Reclamation Center** | 4.1 | 75.2268 | 72.84322 | $79,763.32 |
| **West Plains WWTP** | 3.0 | 55.044 | 53.29992 | $58,363.41 |